ZINC ACCUMULATION AND TRANSLOCATION IN *SOLANUM NIGRUM*: EFFECT OF ARBUSCULAR MYCORRHIZAL FUNGI AND MATRIX CONCENTRATION

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Solanum nigrum was found to proliferate in sediments with high levels of metal pollution. The effect of Zn on plant growth and tissue metal accumulation was assessed. The response of the plant to the inoculation with four different isolates of arbuscular mycorrhizal fungi (AMF) (*Glomus* sp. BEG140, *Glomus claroideum*, *Glomus mosseae* and *Glomus intraradices*) was studied. Inoculation with different AMF isolates generally did not induced significant differences of *S. nigrum* biomass, when comparing to non-inoculated controls. However, increasing Zn concentration significantly reduced the biomass of all *S. nigrum* sections.

S. nigrum accumulated up to 1450, 3240 and 3810 mg Zn kg^{-1} in the leaves, stems and roots, respectively, with no visual toxicity signs. When exposed to sand concentrations higher than 100 mg Zn kg^{-1}, despite the toxicity observed, the plant was able to accumulate up to 20470, 49040 and 29010 mg Zn kg^{-1} in the leaves, stems and roots, respectively. The concentration of Zn in the sand matrix affected the Zn content in the tissues of *S. nigrum*, with an increase of the accumulation observed for higher matrix concentrations. AMF inoculation also had an effect on the uptake of Zn by *S. nigrum*, with the inoculation with *G. intraradices* and *G. claroideum* leading to significantly higher ($P < 0.05$) Zn accumulation in all plant tissues.

High translocation factors were obtained, indicating that *S. nigrum* might be a good Zn phytoextractor, as the main metal accumulation is occurring in the aboveground part of the plant. The presence or species of inoculated AMF induced few significant ($P < 0.05$) differences on the translocation of Zn from the root to the aboveground parts of *S. nigrum*, while different metal concentration in the matrix induced higher translocations found in the following order of Zn matrix concentration: 500 > 1000 > 100 > 0 mg kg^{-1}. *S. nigrum* appears to have accumulating characteristics, according to the high Zn levels observed in its tissues and its use in a phytoremediation approach of a metal contaminated site should be taken into account, mainly due to its high metal extraction and accumulation capacities, as well as its high translocation properties.

Acknowledgments: The authors wish to thank Câmara Municipal de Estarreja for the provision of access to the site. This work was supported by Fundação para a Ciência e a Tecnologia and Fundo Social Europeu (III Quadro Comunitário de apoio), research grants of Ana Marques (SFRH/BD/7030/2001) and Rui Oliveira (SFRH/BD/1464/2000). Miroslav Vosátka is acknowledged for providing the mycorrhizal fungi inocula. This work was funded by Project MICOMETA - POCI/AMB/60131/2004 (Fundação para a Ciência e Tecnologia)